

## REMARKS

Independent claims 1, 3, 12, 27, 31, 34 and 38 have been amended, new claims 51-57 have been added, claims 6 and 15-20 have been previously canceled, and thus claims 1-5, 7-14 and 21-57 are pending in the application (claims 41-47 have been previously been withdrawn from consideration). In view of the following remarks, it is respectfully submitted that claims 1-5, 7-14 and 21-57 are allowable.

### Claim Rejections – 35 U.S.C. § 102

Claims 1, 2, 5, 12, 27-30, 34-37 and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,834,573 to Nakahara (hereinafter “Nakahara”) with reference to related/equivalent disclosures of the Nakahara family as outlined on page 2 of the Office Action. Claims 1, 12, 27 and 34 are independent. Applicants respectfully traverse this rejection.

Nakahara describes a saw blade for cutting metal workpieces, and for creating curls from the chips produced during cutting. The saw blade includes teeth having small-diameter curl forming sections 11 provided to each of the saw teeth 3, 5 and 7 for curling chips generated at the time of cutting (col. 4, lines 62-65). Each small-diameter curl forming section 11 has a plane rake face 19 and a **curved face 21** (col. 4, lines 66-67; FIGS. 1A, FIGS. 4A-4C and FIG 6). The rake face 19 extends by a predetermined length B from the point 13 of the saw teeth 3, 5, or 7 toward a bottom portion 17 of a gullet section 15 (col. 5, lines 1-4). Curved face 21 is provided **along an arc of a radius or multiple radiuses R continuously to the rake face 19** (col. 5, lines 4-5; col. 6, lines 19-29). Thus, curved face 21 is **curved** along its entire length.

As shown in FIG. 3, the chips S being generated are curled into a small-diameter coil or spring shape by the arc-like curved face 21, and are positioned in the gullet 15 of the saw blade 1 (col. 5, lines 53-56). Any tendency of the generated chips to flow sideways is low, and the chips are curled so as to remain in the gullet 15 (col. 5, lines 62-64).

As a result, Nakahara fails to teach or suggest a shelf with **a planar portion** as claimed, nor a **planar portion** extending substantially parallel to the substantially planar back edge portion or a planar portion that extends at an angle in a direction that is opposite the cutting direction and generally toward the back edge of the band saw blade, as recited in independent claims 1, 12, 27 and 34. In direct contrast, each small-diameter curl forming section 11 of Nakahara has a vertical plane rake face 19 and a **curved face 21** for curling metal chips into a small-diameter coil or spring shape. Therefore, the currently rejected independent claims 1, 12, 27 and 34 are not anticipated by Nakahara and it is respectfully submitted that the claims are patentable for at

least these reasons.

Claims 2, 5, 28-30, 35-37 and 48 depend from claims 1, 12, 27 and 34, either directly or indirectly. Thus, for reasoning that is the same as or similar to that provided in support of the patentability of claims 1, 12, 27 and 34, claims 2, 5, 28-30, 35-37 and 48 are patentable over Nakahara with reference to related/equivalent disclosures of the Nakahara family. Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 5, 12, 27-30, 34-37 and 48.

#### **Claim Rejections – 35 U.S.C. § 102/103**

Claims 13 and 14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nakahara with reference to the related/equivalent disclosures of the Nakahara family, or in the alternative, are obvious under 35 U.S.C. § 103(a). Applicants respectfully traverse these rejections.

Claims 13 and 14 are dependent on claim 12. Therefore, claims 13 and 14 are patentable for at least the reasons discussed above with respect to claims 12. Further, claims 13 and 14 are patentable for reciting additional patentable subject matter. Nakahara fails to teach or suggest the specific angled relationships of the shelf recited in claims 13 and 14, as well as the recited length in claim 14. The specification of Nakahara does not describe any “angle” of the curved face 21. Apparently, the Examiner is “eyeballing” an angle from Fig. 6, which is improper.

The Examiner alternatively states that if the dimensions are not taught by Nakahara, etc., the dimensions are mere discovery of the optimum or workable ranges within the general conditions of the prior art by routine experimentation and therefore obvious to one of ordinary skill in the art. Office Action, page 4. As explained below, Applicants submit that the specific angled relationships of the shelf recited in claims 13 and 14, and the recited length recited in claim 14, would not be derived by one of ordinary skill in the art based on “optimization” of Nakahara, etc.

#### **Claim Rejections – 35 U.S.C. § 103**

Claims 3, 4, 7-9, 10, 11, 21, 22, 25, 26, 31, 38, 49 and 50 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Nakahara with reference to related/equivalent disclosures of the Nakahara family. Applicants respectfully traverse this rejection.

Claims 10, 11, 21, 22, 25, 26 and 49 are dependent upon patentable claims 1 and 27, and thus are also patentable. Similarly, independent claims 3, 31 and 38 also recite a shelf with a planar portion extending substantially parallel to the substantially planar back edge portion or a

shelf with **a planar portion** that extends at an angle in a direction that is opposite the cutting direction and generally toward the back edge of the band saw blade. As explained above, Nakahara fails to teach or suggest such a shelf with **a planar portion**. Thus, claims 3, 31 and 38, and claims 4, 7-9 and 50 which depend on claims 3 or 31, are also patentable.

Claims 3, 4, 7-9, 10, 11, 21, 22, 26, 26, 31, 38, 49 and 50 (as well as new claim 57) are also patentable over Nakahara with reference to the related/equivalent disclosures of the Nakahara family for the additional reason that the specific dimensions and/or ratios set forth in the claims are not taught or suggested by Nakahara, etc. Nor, as asserted by the Examiner, would they be the result of mere discovery of the optimum or workable ranges within the general conditions of the prior art by routine experimentation. See, Office Action, page 4-5.

In order for the Examiner to meet the burden to establish a *prima facie* case of obviousness based on optimization/routine experimentation, the Examiner must first demonstrate that the prior art recognizes that the claimed dimensions and/or ratios are result effective variables which affect the result recognized in the current application. See, MPEP 2144.05(II)(B): “A particular parameter must first be recognized as a result-effective variable, i.e., **a variable which achieves a recognized result**, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.)” Emphasis added. The cited art does not recognize the effects of the claimed parameters for collecting and removing wood dust and chips, as recited in the claims. Therefore, no *prima facie* case of obviousness has been made.

The present claims are directed to a wood cutting band saw blade. The function and purpose of the claimed shelves are “for reducing saw dust passing to the kerf and accumulating on the band saw blade” (claims 1, 3, 12, 31 and 38), “for reducing the quantity of dust passing through the dust gap and accumulating on the band saw blade” (claim 27), and “for effectively reducing the dust gap dimension” (claim 34).

In contrast, Nakahara, etc., relate solely to metal cutting and the characteristics of the metal chips formed therefrom and are in no way concerned with the problems associated with cutting wood and removing sawdust and chips from the kerf when cutting wood. The problems

of metal cutting are very different from wood cutting. More specifically, Nakahara, etc., attempt to take long metal chips formed by meal cutting blades (See FIG. 9 of Nakahara) and form them into small diameter or spring shaped curls. See, col. 2, lines 45-48 of Nakahara and lines 9-11 of the "Constitution" section of the Abstract of JP '716. To this end, the curved surface 21 of the curl forming section 11 of Nakahara has a different purpose and function than the shelves of the present invention - the curved surface 21 forms the curls. See, col. 4, line 66 - col. 5, line 40. In fact, curved surface 21 must be curved to form a curl. If any surface is not curved, a curl will not properly form. See, col. 5, lines 15-23 of Nakahara and lines 9-13 of the "Constitution" section of the Abstract of JP '716. In addition, the distance "B" between the tip of the teeth and the curved face 21 must be limited to properly form the curl. Nakahara expressly states that the distance is less than 2mm. See, col. 5, lines 27-28.

Thus, generally speaking, due to the differences in the function and purpose of the claimed shelves and the curved surface 21 of the curl forming section 11 of Nakahara, Nakahara does not provide any guidance to one of ordinary skill in the art as to shelves for addressing wood chips and saw dust of the present invention. The differences mean there would be no predictability in applying Nakahara to wood cutting, as claimed, and accordingly no reasonable expectation of success. Without these, the invention cannot be obvious. See MPEP 2143.02.

Further, again due to the differences of the function and purpose of the claimed invention and Nakahara, one of ordinary skill in the art would not even attempt to "optimize" Nakahara as the Examiner asserts. Regardless, as Nakahara does not recognize that the claimed features are the result effective variable with respect to the specific purpose and functions of the claimed shelves in wood cutting, the assertion of optimization cannot be sustained. See MPEP 2144.05(B).

For example, claims 3, 4, 7, 8, 31 and 38 recite specific ratios of the distance between the tip of a respective tooth and the shelf, and the distance between the tip of a respective tooth and the bend plane. The specification and claims state that these **ratios** advantageously allow the shelf to **collect and remove wood dust and chips from the kerf wall during wood cutting**. See, Page 6, line 23 - Page 8, line 19. Nakahara completely fails to discuss such ratios, much less recognize that these variables (the ratios) achieve the claimed result (collection and removal of wood dust and chips from the kerf wall), i.e., are result-effective variables. Instead, Nakahara discusses dimensions (but not ratios) of the curl forming section 11, but only in respect to ensuring that they form small diameter or spring shaped curls. Therefore, the present invention

cannot be achieved through “optimization” of Nakahara.

In addition, the claims are not obvious because the Applicants’ invention produces unexpected results. See MPEP 2144.05(III) (claimed ranges not obvious where “there are new and unexpected results relative to the prior art.” *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 USPQ2d 1225, 1228 (Fed. Cir. 2004). Emphasis added. As discussed above, the curved surface 21 of the curl forming section 11 of Nakahara forms small diameter or spring shaped curls. In contrast, the claimed invention does not produce small diameter or spring shaped curls, but rather **collects and removes wood dust and chips from the kerf wall during wood cutting**. This result is not predicted by Nakahara, or predictable in view of Nakahara’s sole teaching that the curved surface 21 produces small diameter or spring shaped curls. The results of the claimed shelves are thus unexpected and the claims are not obvious over Nakahara for this additional reason.

Further, claims cannot be obvious where the modification asserted by the Examiner would improperly alter the principle operation of the Nakahara, etc., and render it unsatisfactory for its intended purpose (here, to form small diameter or spring shaped curls). See MPEP 2143.01(V) and (VI). If the curved surface 21 of the curl forming section 11 were modified to include a planar portion extending substantially parallel to the substantially planar back edge portion or a planar portion extending at an angle in a direction that is opposite the cutting direction and generally toward the back edge of the blade, as claimed, the planar portion would cause the metal chips to break apart, fold or otherwise interfere with forming the chips into small-diameter coil or spring shapes. Nakahara also requires that the height B of the rake face 19 (or the distance B between the tip of the tooth and the curved surface 21) be less than 2mm, and thereby teaches away from modifying the configuration of the curved surface 21 in such a way that could render “B” greater than 2mm, as in Applicants’ claims. See, Column 5, lines 27-28. See also, MPEP 2145(II)(X)(D) (claims not obvious where prior art teaches away). If this dimension were altered as the Examiner contends, the Nakahara blade would fail to properly curl chips. Therefore, the “optimization” asserted by the Examiner is improper because it would change the principle operation of Nakahara and render it unsatisfactory for its intended purpose. In view of this, one of ordinary skill in the art would not modify Nakahara as the Examiner contends, and the claims are not obvious.

Applicants note that new independent claim 57 has been added herein. Claim 57 recites certain dimensions and ratios of the teeth and shelves. As demonstrated above with respect to

the Examiner's obviousness rejections, these features render claim 57 patentable.

Finally, claims 23-25, 32, 33, 39 and 40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakahara with reference to the related/equivalent disclosures of the Nakahara family in view of Japanese Publication 6-716 to Nakahara (hereinafter "JP '716"). Applicants respectfully traverse this rejection.

These claims are patentable as being dependant on patentable claims. More specifically, as explained above, Nakahara fails to teach or suggest a shelf with **a planar portion** extending substantially parallel to the substantially planar back edge portion or **a planar portion** that extends at an angle in a direction that is opposite the cutting direction and generally toward the back edge of the band saw blade, as contained in claims 23-25, 32, 33, 39 and 40. Further, Nakahara does not teach or suggest the specific dimensions recited in claims 24, 25, 33 and 40.

Like Nakahara, JP '716 describes a metal cutting saw blade and fails to cure the above-noted defects of Nakahara. Similar to Nakahara, JP' 716 is directed to forming curls from long chips created from metal workpieces. The saw blade teeth of JP '716 include a straight-line part extending from a cutting point of the tooth to an arcuate-shaped chip induction surface. Chips fed from the straight-line part are guided to the arcuate surface to form a curl. However, JP '716 does not describe or suggest a wood cutting band saw blade, or a shelf with **a planar portion** extending substantially parallel to the substantially planar back edge portion or a shelf with **a planar portion** that extends at an angle in a direction that is opposite the cutting direction and generally toward the back edge of the band saw blade. Further, JP '716 does not teach or suggest the specific dimensions recited in claims 24, 25, 33 and 40. Considering the differences between generating curled chips and collecting and removing dust or wood chips as in the present invention, a person of ordinary skill in the art would have no reason to use a second shelf of a metal cutting/curl chip forming blade in the present wood-cutting invention, or arrive at the specific dimensions set forth in the claims.

Thus, Nakahara and JP '716, whether considered alone or in combination, do not teach or suggest a wood cutting band saw blade as recited in claims 23-25, 32, 33, 39 and 40.

## CONCLUSION

All issues raised by the Examiner having been addressed, an early allowance of the claims is earnestly solicited. If the Examiner has any questions in connection with this paper, or

otherwise if it would facilitate the examination of this application, he is respectfully requested to call the undersigned at the telephone number below.

In the event the Commissioner of Patents and Trademarks deems additional fees to be due in connection with this application, please consider this an authorization to charge such fee(s) to Deposit Account No. 50-3569.

Respectfully submitted,

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